SUB A17

1. A computer-readable medium containing a data structure defining a query definition, the data structure including:

a query specification including query text and parameters, the parameters having values that may be set when the query definition is executed;

a results transform that transforms results of executing the query specification into a canonical format; and

a data source identifier that identifies a data source to be used when the query specification is executed.

2. The computer-readable medium of claim 1 wherein the results transform is an XSL transform.

3. The computer-readable medium of claim 1 wherein the data structure is represented in XML format.

4. The computer-readable medium of claim 1 wherein the data structure conforms with the following data type definition of XML:

```
<!DOCTYPE lens [
    <!ELEMENT query (#PCDATA) REQUIRED>
    <!ELEMENT params (param+)>
        <!ELEMENT param (allowedvalues | props)*>
        <!ATTLIST param name CDATA REQUIRED>
        <!ATTLIST param value CDATA REQUIRED>
    <!ELEMENT formats (format+) REQUIRED>
        <!ELEMENT format (#PCDATA)>
        <!ATTLIST format name CDATA REQUIRED>
    <!ELEMENT serverurl (#PCDATA) REQUIRED>
]>
```

5. The computer-readable medium of claim 1 wherein the data structure includes a name.

6. The computer-readable medium of claim 1 wherein the data structure includes a description.

7. The computer-readable medium of claim 1 wherein the data structure includes a version.

8. The computer-readable medium of claim 1 wherein the data structure includes an author.

9. The computer-readable medium of claim 1 wherein the data structure includes a date last modified.

10. The computer-readable medium of claim 1 wherein the data structure can be used by different application programs.

11. A method in a computer-system for performing a query, the method comprising:

receiving an indication of a query definition, the query definition including a query specification and a results transform;

identifying a data source;

requesting execution of the query specification with the identified data source to generate results in a raw format; and

transforming the generated results in the raw format to a canonical format.

12. The method of claim 11 wherein the query definition includes an indication of the data source and the identifying of the data source includes retrieving the indication from the query definition.

13. The method of claim 11 wherein the query specification includes an indication of a parameter for the query specification and the method includes receiving a value for the parameter wherein the requesting of the execution of the query specification indicates the value of the parameter.

14. The method of claim 11 wherein the query specification includes an indication of a parameter for the query specification and a value for the parameter.

15. The method of claim 14 including updating the value of the parameter wherein the value is stored with the query specification.

16. The method of claim 11 wherein the results transform is an XSL transform.

17. The method of claim 11 wherein the results transform includes instructions for display of the generated results.

18. A computer-readable medium containing a data structure for representing results of a query in a canonical format, the format being expressed in XML, the data structure including:

a table element;

one or more row elements;

for each row element, one or more data elements; and

each data element having one or more values or table elements with row elements and data elements.

19. The computer-readable medium of claim 18 wherein the data structure is represented by the following XML format:

```
<!DOCTYPE FORMATTING [
    <!ELEMENT (table)>
```

```
<!ELEMENT value #PCDATA>
    <!ATTLIST value color CDATA>
    <!ATTLIST value style (b|i|bi|p>
    <!ATTLIST value size CDATA>
    <!ATTLIST value face CDATA>
    <!ATTLIST value dynamic (true|false)>
<!ELEMENT table (tr*)>
    <!ATTLIST table name CDATA #REQUIRED>
    <!ATTLIST table border CDATA>
    <!ATTLIST table cellpadding CDATA>
    <!ATTLIST table cellspacing CDATA>
    <!ATTLIST table bordercolor CDATA>
    <!ATTLIST table valign CDATA>
<!ELEMENT tr (td*)>
    <!ELEMENT td (value | table)*>
        <!ATTLIST td id CDATA #REQUIRED>
        <!ATTLIST td colspan CDATA>
        <!ATTLIST td rowspan CDATA>
        <!ATTLIST td align CDATA>
        <!ATTLIST td valign CDATA>
]>
```

20. A computer-based method for performing queries, the method comprising:

under control of a plurality of different application programs;

receiving an indication of a query definition, the query definition including query text and a data source identifier; and

requesting execution of the query text with the data source to generate results

whereby the same query definition is used by the plurality of different application programs.

21. The method of claim 20 wherein the query definition includes a results transform and including using the results transform to transform the generated results from a raw format to a canonical format.

22. The method of claim 21 wherein the results transform is an XSL transform.

23. The method of claim 20 including transforming the generated results from a raw format to a canonical format.

24. The method of claim 20 wherein the query definition is a lens file.

25. The method of claim 20 wherein the query definition is stored in a single file.

26. The method of claim 20 wherein the results are in a canonical format.

27. A computer-readable medium containing a data structure defining a query definition, the data structure comprising:

a query specification including query text that is an expression of the query; and

a data source identifier that identifies a data source to be used when the query specification is executed

whereby the data structure is in a common format that can be used by a plurality of different application programs to define a query that is to be executed.

28. The computer-readable medium of claim 27 wherein the data structure further includes a results transform for transforming results of the execution of the query to a canonical format.

29. The computer-readable medium of claim 28 wherein the results transform is an XSL transform.

30. The computer readable medium of claim 27 wherein the data structure is represented in XML format.

31. The computer-readable medium of claim 27 wherein the query specification includes parameters having values that may be set when the query is executed.

32. The computer-readable medium of claim 31 wherein the query specification includes possible values for the parameters.

33. The computer-readable medium of claim 27 wherein the query specification includes sort variables for ordering of the results of the query.

34. The computer-readable medium of claim 27 wherein execution of the query produces the same query results for each application program.

35. A computer-readable medium containing instructions for controlling computer systems to execute queries by a method comprising:

receiving a query definition that includes a query specification and a data source identifier, the query definition being in a format that can be accessed by a plurality of different application programs; and

requesting execution of the query definition to generate results.

36. The computer-readable medium of claim 35 wherein the query definition includes a results transform and including using the results transform to transform the generated results from a raw format to a canonical format.

37. The computer-readable medium of claim 36 wherein the results transform is an XSL transform.

38. The computer-readable medium of claim 35 including transforming the generated results from a raw format to a canonical format.

39. The computer-readable medium of claim 35 wherein the query definition is a lens file.

40. The computer-readable medium of claim 35 wherein the query definition is stored in a single file.

41. The computer-readable medium of claim 35 wherein the results are in a canonical format.

42. The computer-readable medium of claim 35 wherein the requesting of execution of the query includes invoking a function of a first interface that returns a second interface for retrieving the results a portion at a time.

43. The computer-readable medium of claim 42 wherein the first interface is the ILens interface.

44. The computer-readable medium of claim 42 wherein the second interface is the IChunks interface.

45. A computer system for executing queries, the computer system comprising:

means for receiving a query definition that includes a query specification and a data source identifier; and

means for requesting execution of the query definition to generate results.

46. The computer system of claim 45 wherein the query definition includes a results transform and including using the results transform to transform the generated results from a raw format to a canonical format.

47. The computer system of claim 46 wherein the results transform is an XSL transform.

48. The computer system of claim 45 including transforming the generated results from a raw format to a canonical format.

49. The computer system of claim 45 wherein the query definition is a lens file.

50. The computer system of claim 45 wherein the query definition is stored in a single file.

51. The computer system of claim 45 wherein the results are in a canonical format.

52. A method in a computer system for generating a data structure defining a query definition, the method comprising:

storing in the data structure a query specification including query text that is an expression of the query; and

storing in the data structure a data source identifier that identifies a data source to be used when the query definition is executed

whereby the data structure is in a portable format that can be used by a plurality of different application programs to execute the query definition.

53. The method of claim 52 including storing in the data structure a results transform for transforming results of the execution of the query definition to a canonical format.

54. The method of claim 52 including storing in the data structure indications of parameters whose values may be set when the query definition is executed.

55. The method of claim 54 including storing in the data structure possible values for the parameters.

56. The method of claim 54 wherein the query text may be modified before execution when a value for a parameter is not specified.

57. The method of claim 52 including storing in the data structure sort variables for controlling ordering of the results of the query.

58. A method in a computer system for adjusting a query expression based on a parameter value not being specified at execution time, the method comprising:

receiving a query expression along with an indication of a parameter that may be specified before executing the query expression; and

when the query expression is to be executed without a value of the parameter being specified,

modifying the query expression to remove a portion of the query expression that depends on the parameter; and

executing the modified query expression.

59. The method of claim 58 wherein the query expression includes query sub-expressions and the modifying includes removing a query sub-expression that depends on the parameter.

60. The method of claim 58 wherein the query sub-expressions are combined by a logical-AND.

61. The method of claim 58 wherein the query sub-expressions are combined by a logical-OR.

62. A computer system for adjusting a query expression based on a parameter value not being specified at execution time, the computer system comprising:

means for receiving the query expression along with an indication of a parameter, the query expression having query sub-expressions; and

means for modifying the query expression to remove a query sub-expression that depends on the parameter when the query expression is to be executed without a value of the parameter being specified; and

means for executing the modified query expression.

63. The computer system of claim 62 wherein the query sub-expressions are combined by a logical-AND.

64. The computer system of claim 62 wherein the sub-expressions are combined by a logical-OR.